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SEASONALLY ADJUSTED RETAIL FOOD PRICE INDEXES

By
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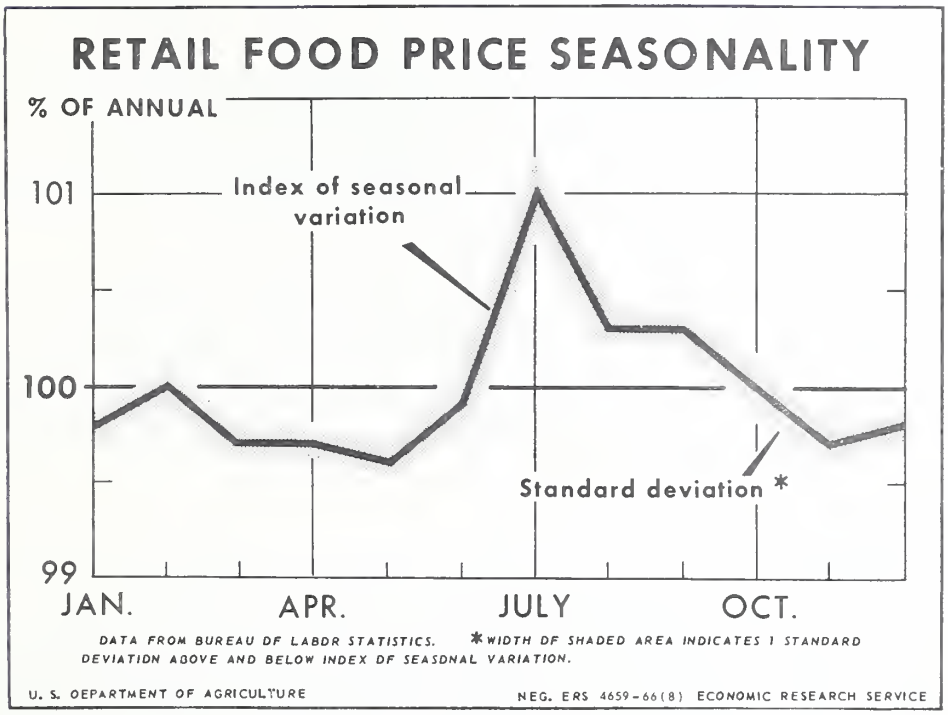

Since January 1966, the Bureau of Labor Statistics has reported food price indexes both on a seasonally adjusted and unadjusted basis. The seasonal factors used to adjust food price indexes show that food prices typically reach their high point of the year in July. The seasonal increase of 1.1 percent from June is the largest monthly change within the year. After July, prices usually decline seasonally into the fall months. November prices typically are 1.3 percent lower than the July high. These changes are much greater than twice the estimated standard deviation of the seasonal factors of about 0.15 percent.

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SEASONALLY ADJUSTED RETAIL FOOD PRICE INDEXES 1/

Seasonal price changes are more-or-less regular variations around the secular price trend. They are due primarily to relatively irregular rates of production within the year compared to relatively stable demands, seasonal changes in supplies and prices of competing products, and seasonal fluctuations in demand for some products. Uneven production flows often mean that storage costs must be covered in the off-season. For example, anticipated higher prices for pork in the summer months, when production is relatively low, induces accumulation of storage supplies during peak production periods. Since peak production for many food products, particularly crops, occurs in late summer, prices tend to be the highest just prior to this time. But prices drop quickly when production increases. Fruits and vegetables, in particular, drop sharply once the seasonal peaks have passed.

Changes in retail prices typically lag changes in prices received by farmers and wholesale prices by approximately the time required to move food through the marketing pipeline. Wholesale prices for farm products reach their seasonal high point about April, wholesale prices for processed foods in June, and retail food prices--strongly influenced by fresh fruits and vegetables and pork--in July (cover chart). 2/

New Seasonally Adjusted Indexes

The Bureau of Labor Statistics (BLS) began publishing retail food price indexes on a seasonally adjusted basis for January 1966, in addition to the regular unadjusted price indexes. Seasonally adjusted indexes were published for all food, food at home, and 4 major food commodity groups through May but, beginning with June, seasonally adjusted prices are being published for individual foods as well. No adjusted index is being published for food away from home since little seasonal variation occurs. Neither is an adjusted index being published for the overall Consumer Price Index (CPI) since seasonal changes within groups tend to be offsetting. BLS does not intend to publish seasonally adjusted indexes for previous years, except for 1965. 3/ Adjusted indexes are published only for the U. S. average, and not for any of the individual metropolitan areas for which separate price indexes are published.

Seasonal adjustment factors and their standard deviations were computed by BLS (but were not published) for many of the foods priced for the CPI (table 12). The seasonal factors were revised from those published in 1963 in Seasonal Factors: Consumer Price Index: Selected Series, June 1953-May 1961.4/

1/Stephen J. Hiemstra, Head, Food Consumption Section, ERS.

2/Department of Labor, Bureau of Labor Statistics, Prices: A Chartbook, 1953-62, **Bulletin** No. 1351, December 1962, page 204.

3/Monthly Labor Review, April 1966, table D-2, p.472.

4/Bureau of Labor Statistics Bulletin 1366. Indexes of seasonal retail price variation for selected food products from the BLS study were published in the November 1963 issue of the National Food Situation, NFS-106.

Table 12.--Indexes of seasonal retail price variation and standard deviation for selected food components of the Consumer Price Index 1/

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Standard deviation
All food	99.8	100.0	99.7	99.7	99.6	99.9	101.0	100.3	100.3	100.0	99.7	99.8	0.15
Food at home	99.8	100.0	99.7	99.6	99.5	99.9	101.3	100.4	100.3	100.0	99.6	99.7	.2
Meats, poultry, fish	100.0	100.0	99.3	98.7	98.2	98.5	100.2	101.4	102.1	101.2	100.4	99.8	.3
Meats	99.8	99.5	98.8	98.5	98.0	98.2	100.3	101.7	102.4	101.8	100.6	100.0	.4
Beef and veal	100.8	100.6	99.8	99.2	98.8	97.9	99.0	100.3	101.0	101.0	101.0	100.8	.4
Round steak	100.3	100.6	99.5	99.2	99.0	98.1	99.6	100.5	100.3	101.6	100.9	100.6	.7
Rib roast	101.8	100.5	99.6	98.8	98.4	98.3	99.2	100.1	100.8	100.9	100.4	100.8	.5
Chuck roast	101.7	101.6	101.0	99.7	98.2	95.1	96.3	99.5	101.4	100.8	102.2	102.1	.9
Hamburger	100.7	100.0	99.4	99.0	98.6	99.3	99.6	99.4	101.3	100.7	100.7	100.9	.4
Veal cutlets	99.8	100.9	100.5	100.1	100.0	100.0	99.9	99.7	100.1	99.6	99.3	99.7	.2
Pork	98.6	98.4	97.3	96.7	97.1	98.2	102.2	104.3	105.1	102.7	100.3	98.8	.7
Pork chops	98.9	98.4	96.8	96.0	95.4	98.0	103.4	106.1	104.7	103.6	100.4	98.0	.7
Ham, whole	101.1	100.4	99.4	98.8	97.4	98.4	99.5	101.1	101.1	100.5	100.5	101.3	.4
Bacon	97.1	97.7	96.9	96.3	97.4	98.1	102.6	106.0	106.7	103.0	99.7	98.1	.8
Other meats	99.9	99.8	99.6	99.6	99.8	100.0	99.8	100.1	100.7	100.5	100.3	100.0	.2
Frankfurters	99.7	99.6	99.7	99.5	99.3	99.8	99.7	100.0	101.2	100.8	100.7	100.1	.3
Chicken, frying	99.9	101.3	101.3	100.1	98.3	100.8	101.2	99.6	100.4	99.1	99.6	98.4	1.0
Fish	100.4	100.6	100.0	100.1	100.1	99.9	99.8	99.7	99.5	99.6	100.0	100.0	.1
Fresh or frozen	100.4	100.6	100.0	100.2	100.2	99.6	99.8	99.8	99.8	99.6	99.9	99.9	.2
Dairy products	100.7	100.3	100.1	99.5	99.2	99.0	99.5	99.9	100.2	100.6	100.6	100.7	.1
Fresh milk, grocery	100.9	100.4	100.0	99.2	98.6	98.1	99.1	100.1	100.5	101.0	101.1	101.0	.1
American cheese	100.2	100.3	100.3	100.0	100.0	99.9	99.7	99.7	99.8	99.9	100.1	100.0	.2
Butter	100.4	100.1	100.0	99.7	99.6	99.4	99.4	99.4	99.9	100.7	100.6	100.7	.1
Fruits and vegetables	97.7	99.0	100.0	101.8	103.4	105.1	106.7	100.7	96.4	95.8	96.1	97.3	.6
Fresh fruits and vegetables	96.4	98.5	99.9	102.7	105.2	108.0	110.8	101.1	94.8	93.5	93.9	95.7	.9
Apples	86.7	91.2	94.5	101.1	108.9	121.1	129.5	125.8	95.2	81.5	79.8	84.3	1.1
Bananas	96.4	101.3	100.3	100.1	99.9	100.8	99.6	100.6	101.0	103.1	99.0	98.2	.2
Oranges	91.9	93.6	95.4	99.4	98.3	98.1	100.8	103.1	107.2	108.3	105.8	98.2	1.7
Grapefruit	86.9	89.1	88.1	89.8	95.2	106.9	113.2	116.4	116.7	117.0	93.2	87.3	2.3
Potatoes	93.5	94.8	95.0	97.6	103.8	115.3	123.1	105.9	95.8	92.6	91.5	91.9	2.0
Onions	95.2	96.9	96.8	102.4	103.8	109.0	112.6	109.2	95.4	92.5	91.4	94.2	2.4
Cabbage	110.7	113.1	112.2	107.0	110.0	109.5	98.8	89.4	86.4	87.4	84.9	90.7	4.6
Carrots	102.9	98.4	95.1	93.7	95.8	104.4	106.3	105.0	100.1	98.0	99.0	101.5	1.1
Celery	102.5	101.7	105.1	100.4	102.3	100.4	110.7	97.0	92.5	95.0	96.1	96.5	1.8
Lettuce	103.5	109.1	102.7	96.6	98.5	100.8	91.1	91.8	98.5	99.7	107.9	99.6	5.5
Tomatoes	114.9	106.0	112.6	116.4	116.8	105.2	110.1	73.3	68.3	74.1	90.2	111.3	3.9
Grapes	---	---	---	---	---	---	130.4	98.8	83.7	91.0	97.8	---	1.6
Strawberries	---	---	---	113.2	96.1	88.1	---	---	---	---	---	---	.8
Watermelon	---	---	---	---	---	121.9	94.8	80.5	---	---	---	---	2.1
Frozen orange juice	102.9	101.4	100.9	100.7	98.5	97.8	98.4	98.8	98.8	99.2	100.7	102.1	1.2
Cereal and bakery products	100.2	100.1	100.0	100.0	99.9	99.9	99.9	99.9	99.9	100.0	100.1	100.1	.1
Other foods at home 2/	100.8	100.2	99.3	99.1	98.8	98.4	99.2	99.8	101.4	101.8	100.8	100.5	.3
Eggs	103.9	102.5	97.4	96.4	90.5	88.3	92.4	97.4	109.7	110.4	106.5	105.0	1.4

1/ These indexes, based on annual average equal to 100, are being applied to retail price indexes for 1966; updated factors will become available at the end of each year in the future. 2/ Includes eggs, fats and oils, sugar and sweets, nonalcoholic beverages, and prepared foods.

Unpublished data from Bureau of Labor Statistics.

The seasonally adusted price index for all food for June 1966 stood at 114.0 (1957-59=100), down from 114.3 in April (table 13). It compares with 113.9 for the unadjusted index for June 1966 (table 17, p. 48). The price increase of 0.4 percent from May to June 1966, on an unadjusted basis, was erased entirely on an adjusted basis. In 1965, the peak within the year was reached in December on an adjusted basis rather than in July on an unadjusted basis.

The revised seasonal factors were derived using the 1964 BLS seasonal factor method. 5/ This method reduced the variation in seasonal factors over time, in comparison with the method used in the 1963 study. The computational procedure used by BLS involved a series of successive approximations that ended with secular (trend-cycle), seasonal, and irregular components of price variation over time. Stability was obtained by use of "credence factors" which gave more weight to small irregular variations in the data than to large variations.

Shifts in Seasonality

Higher prices during the off-season may stimulate production shifts over the years, even though production costs may be higher during the off-season. Pork production is an example; winter farrowings may be more costly, but price incentives for reaching the summer market have encouraged earlier production. Even though the total amount of seasonal variation did not decline over the 1956-65 period, the yearly retail price peak in 1965 came later--about September--rather than in July (fig. 5). Prices in April-July in recent years have been seasonally much lower than in previous years.

Beef and veal prices did not exhibit marked seasonality, but some shifts have occurred (fig. 5). The direction of change has been the same as that for pork--down in the second quarter and up in the fourth quarter. As a result, total meat price seasonality shifted noticeably between 1956 and 1965. The second quarter is now the low of the year and the peak comes later in the summer.

The shift in meat prices has been important enough to influence total food prices: In earlier years, second quarter food prices averaged above the first quarter. June, in particular, was a strong month. However, by 1965, seasonal factors had shifted to the point that the second quarter averaged about the same as the first and fourth quarters. The third quarter averaged about 1 percent above the other three. July remains the peak of the year, but June prices no longer are up as much from May as previously.

Shifts in methods of production also may encourage a more even seasonal flow of output. Broiler production is a good example: Large-sized commercial units have stabilized the flow of product to the point that little retail

5/ Department of Labor, Bureau of Labor Statistics, The BLS Seasonal Factor Method (1964), April 1964, 22 pp. The BLS method assumes a multiplicative relationship among the 3 components of a series of original data: Original= (Trend-cycle) (Seasonal) (Irregular).

Table 13.--Retail food price indexes, seasonally adjusted (Index, 1957-59=100)

Year and month	Food at home											All food
	Meats			Frying chicken	Fish	Eggs	Dairy products	Fruits and vegetables		Cereal and bakery products	Total	
	Beef and veal	Pork	Total					Fresh	Total			
1965	106.8	109.4	106.9	90.3	110.6	92.8	105.0	121.7	115.2	111.2	107.2	108.8
Jan.	102.3	97.6	100.3	86.8	108.9	88.2	104.9	120.0	115.0	110.9	105.0	106.8
Feb.	101.8	98.6	100.5	88.6	109.4	84.0	104.9	120.0	114.4	110.6	104.8	106.6
Mar.	102.8	100.1	101.5	88.0	109.9	85.7	104.9	122.3	115.3	110.9	105.3	107.2
Apr.	103.4	100.8	101.9	89.3	110.0	91.9	105.0	123.1	115.5	111.0	105.9	107.6
May	105.2	101.5	103.4	88.6	110.2	96.7	105.0	126.9	117.4	110.9	106.7	108.3
June	112.0	110.9	110.0	93.6	110.5	95.0	105.0	131.1	119.8	111.1	108.9	110.2
July	112.0	114.7	111.3	92.7	111.0	94.4	104.8	125.1	116.5	111.2	108.3	109.8
Aug.	109.8	115.0	110.6	93.0	111.4	92.9	105.1	119.9	113.8	111.2	108.2	109.8
Sept.	108.7	114.1	109.9	92.1	111.6	89.9	105.1	116.2	112.6	111.4	107.7	109.4
Oct.	108.0	115.7	109.8	89.9	111.6	93.8	104.9	117.3	113.3	111.3	107.8	109.7
Nov.	107.2	118.0	110.6	89.8	111.3	96.3	105.2	118.4	114.4	111.3	108.2	110.0
Dec.	108.0	124.3	113.3	90.6	111.5	104.4	105.4	117.2	114.1	112.1	109.2	110.8
1966												
Jan.	108.5	132.8	116.8	90.3	111.6	101.1	105.9	116.7	113.9	112.8	110.0	111.6
Feb.	110.7	135.4	119.4	97.8	112.4	106.4	106.7	123.4	117.7	113.1	111.8	113.1
Mar.	114.1	135.4	121.3	100.0	114.7	111.4	108.0	122.9	117.4	113.6	112.9	114.2
Apr.	116.0	128.9	119.9	100.9	116.0	109.9	109.4	123.8	117.7	114.1	113.2	114.3
May	114.7	125.2	118.7	92.5	118.1	109.2	110.2	120.1	115.3	114.4	112.6	114.0
June	115.2	126.2	118.7	96.3	118.1	100.9	110.7	121.4	115.8	114.8	112.4	114.0
July												
Aug.												
Sept.												
Oct.												
Nov.												
Dec.												

Bureau of Labor Statistics.

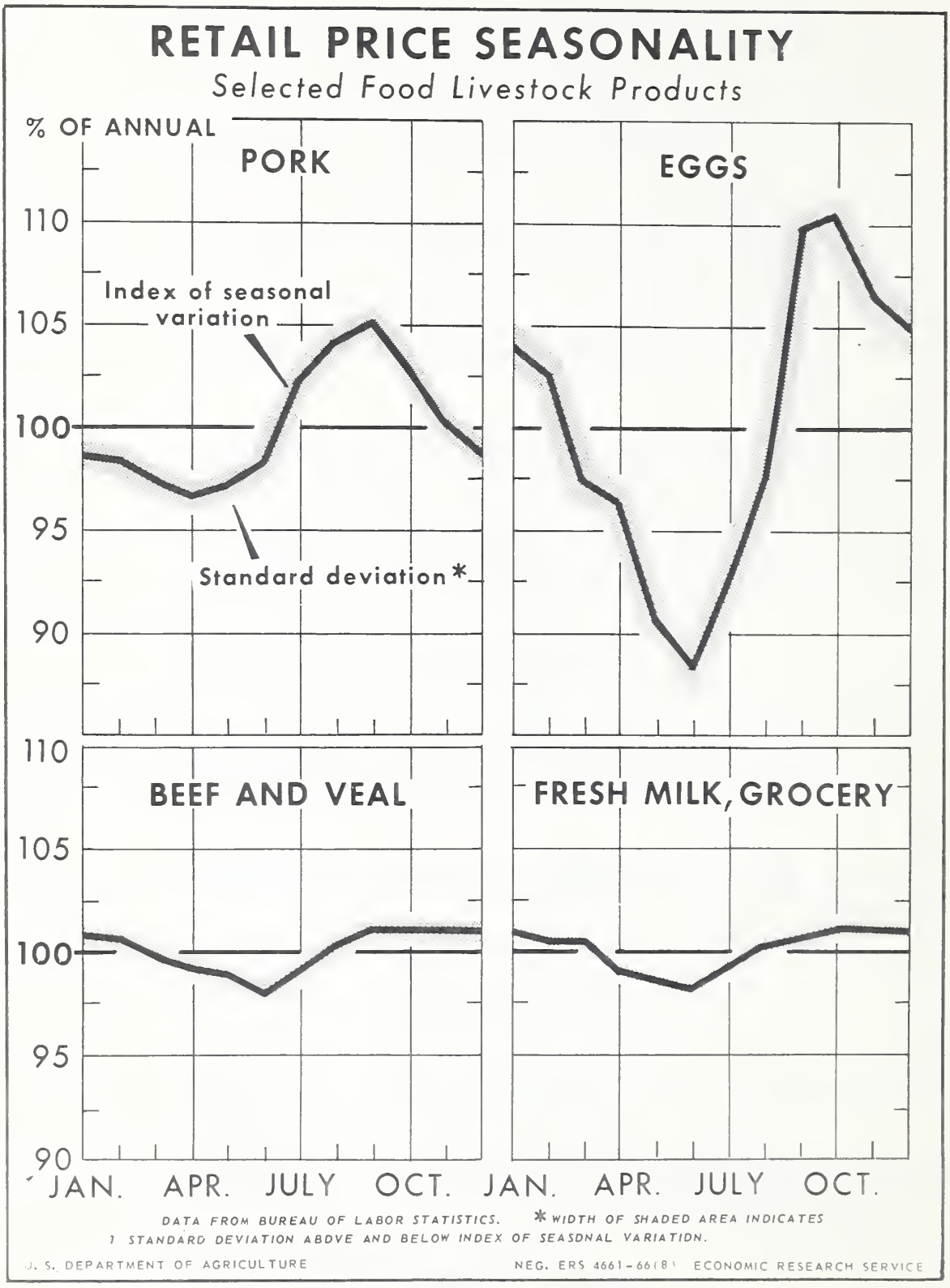
RETAIL PRICE SEASONALITY
Selected Food Livestock Products
% OF ANNUAL
PORK
EGGS
110
105
100
95
90
Index of seasonal variation
Standard deviation*
BEEF AND VEAL
FRESH MILK, GROCERY
JAN. APR. JULY OCT. JAN. APR. JULY OCT.
DATA FROM BUREAU OF LABOR STATISTICS. * WIDTH OF SHADED AREA INDICATES 1 STANDARD DEVIATION ABOVE AND BELOW INDEX OF SEASONAL VARIATION.
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Figure 5

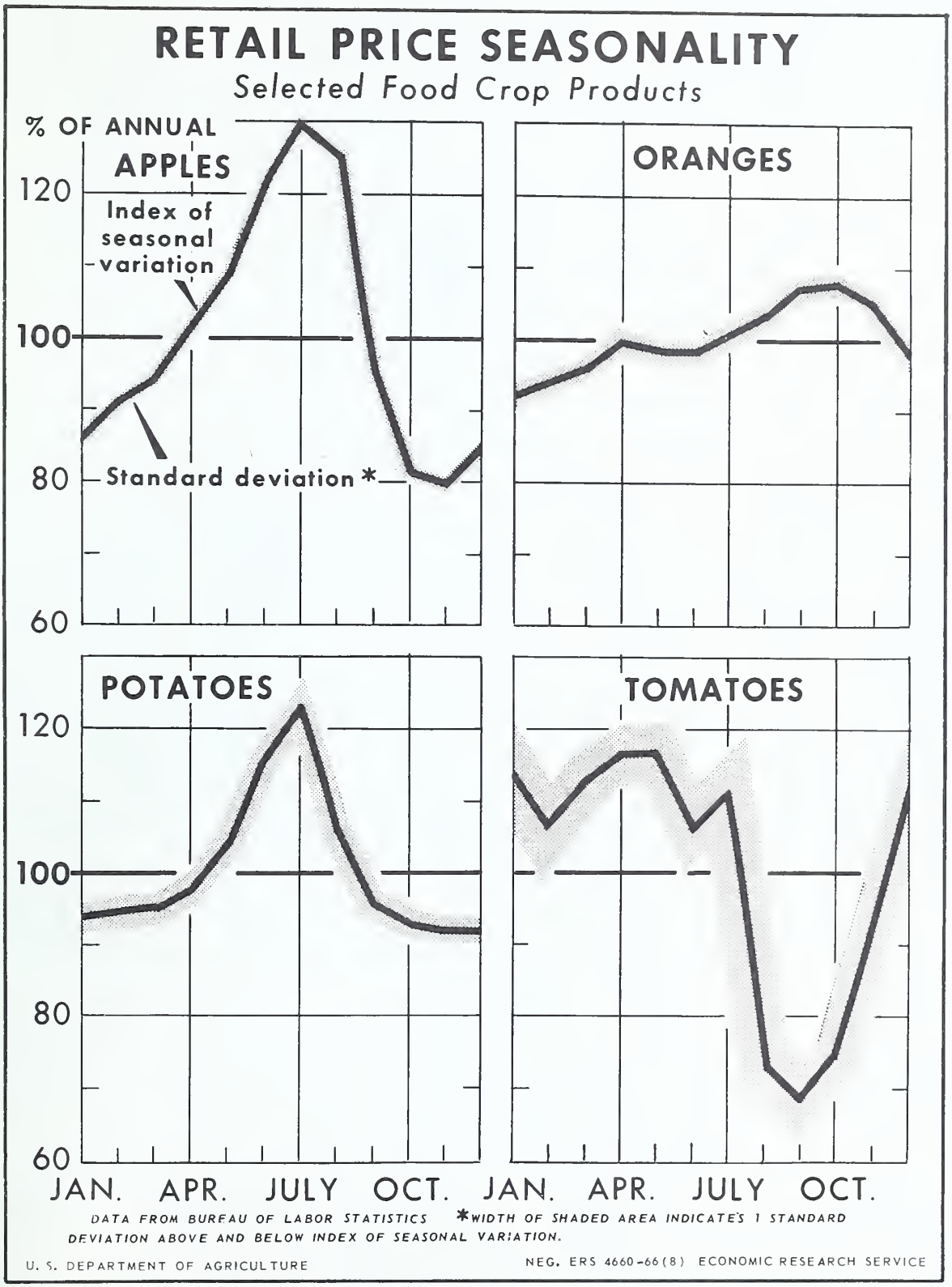
RETAIL PRICE SEASONALITY
Selected Food Crop Products
% OF ANNUAL
APPLES
Index of seasonal variation
Standard deviation *
ORANGES
POTATOES
TOMATOES
120
100
80
60
JAN. APR. JULY OCT. JAN. APR. JULY OCT.
DATA FROM BUREAU OF LABOR STATISTICS *WIDTH OF SHADED AREA INDICATES 1 STANDARD DEVIATION ABOVE AND BELOW INDEX OF SEASONAL VARIATION.
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 4660-66(8) ECONOMIC RESEARCH SERVICE

Figure 6

price seasonality remains for chicken. Only a 3-percent variation from the high to low point remained in 1965, compared with a 9-percent swing in 1956. The 1965 seasonal pattern shifted from that earlier in the 1956-65 period, but may not be statistically significant in view of the size of its standard deviation (table 12). 6/

The seasonal price patterns for eggs and dairy products depart sharply from those for most foods in that they reach their low points in the summer--in about June (fig. 5). Both products exhibited somewhat less fluctuation in 1965 than in 1956. The pattern of variation changed somewhat for eggs: Egg prices in 1965 tended to be relatively higher in the early months of the year and relatively lower in the summer months of July and August, but the peak still came in September-October.

Many changes in seasonality occurred for individual fresh fruits and vegetables between 1956 and 1965, although collectively there was little change in pattern (fig. 6). The price pattern for onions changed noticeably; for example, relatively lower prices in May-June were offset by higher prices late in the year. Carrot prices also shifted considerably: Prices were relatively higher in June-July and lower in September-December. Lettuce prices changed substantially. But lettuce prices vacillate so much, judging from the size of the standard deviation, that the seasonal pattern may have little validity.

Overall, there probably has been some slight decline in seasonal variation in retail food prices in recent years. Between 1956 and 1965, the range of variation within the year from the highest to the lowest month was reduced for all food from 1.6 percent to 1.4 percent. Even so, the amount of seasonality has exceeded the annual average increase in food prices for many years. The variation in food at home dropped a notch--from 1.9 to 1.8 percent. The greater variation for food at home than for total food was due to the small seasonal variation for food away from home that accounts for about a fifth of total food. A decline in total variation was noticeable for chicken, dairy products, eggs, onions, tomatoes, apples, bananas, oranges, and grapefruit. But increases were noted for a few foods--potatoes, for example--and little change for many others.

6/ Standard deviations are shown as bands around the indexes of seasonal variation charted in figs. 5 and 6, one standard deviation above and one standard deviation below the index of seasonal variation.